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EDITORIAL: SOME HIGHLIGHTS.

Fiscal Perspectives and the Price Situation :

The 1971-72 Budget of the Union and the Tamil Nadu Governments have now been established by the legislative bodies. At the Union level modifications in some of the excise duties, wealth tax exemptions and the travel tax increased the deficit by Rs. 15 crores from Rs. 220 crores to Rs. 235 crores. To this should be added Rs. 190 crores just approved by the legislature for the care of Bangla Desh refugees, making a total central deficit of Rs. 425 crores. The approved Tamil Nadu budget for the same period allowing for minor modifications in sales taxes is built on a budget deficit of Rs. 37 crores. The main new financial resources for the State is Rs. 16 crores raised as abkari revenue. The fiscal picture for the country and the State is not bright. The deficits of all the States' budgets for the current year amount to Rs. 205 crores. This deficit financing of over Rs. 600 crores is bound to exert an inflationary pressure on prices and reduce the real performance of our development programme. The Finance Minister calls attention to the all round rise in the prices of consumer goods, even those not subject to or facing increased excises. Since the budget was announced in Tamil Nadu, pulses have moved up by Rs. 2 to 3 per quintal, peas by Rs. 4 to 5 per quintal and black-gram by Rs. 10 to 30 per quintal. The Economic Times All India price index at the end of July shows a 10.5 points price rise within a year and a 1.8 rise in all commodities since the Union and State budgets were introduced. For urban and rural workers price rises have ranged from 4 to 5 percent. Tamil Nadu rural prices have risen by 26.5 per cent since 1965 and the recent spurt is on top of that. The recent price rise is pushing up costs of raw material and labour in large and small plants making for a continuing price spiral. Urgent action is needed to take steps to expand production of industrial raw materials, increase imports and move them quickly to the distribution points in the case of inputs like steel and cotton which are in short supply and release food and raw material stocks from government holding agencies. In addi-

tion it is high time that a consumer resistance movement was developed against these speculative price rises. There is also need to reduce the magnitude of deficit financing by economies in the non-Plan administrative areas of the Union and State Governments. Such a 10 per cent reduction would more than halve the overall deficit in the State and the country. That would also be one means of ensuring the integrity of our development programme. The 10 per cent cut would touch the non-essential items such as travel, entertainment and an increased lapse factor in the staff line.

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Agricultural Trends:

The All-India estimate of food production for 1970-71 is 103 million tonnes, an increase of 6 percent over the previous year and for 1971-72 is 110 million tonnes. Tamil Nadu's total grain production for the same period would move from 70.7 lakh tonnes to 73 lakh tonnes, including paddy production of 53.03 lakh tonnes. The immediate prospects are thus bright, but the long term and continuing increase in our food grains production depends on spreading agricultural modernisation and technology to rice production. Wheat has done and is doing its share. It has contributed to 75 per cent of the increased food output since 1964-65, while rice has increased only by 13 per cent in that period. Rice culture in Tamil Nadu is thus crucial for the agricultural breakthrough in the State and the country. For this attention needs to be paid to seeds, fertilizer and pesticide use, water, credit and markets. In seed attention needs to be given not only to high-yielding, but equally to disease resisting varieties, of which IR 5 and IR 20 have been good starters. These strains will decrease the need for pesticide but call for intensive use of fertilizers, an area in which Tamil Nadu is lagging as was emphasized in issue No. 6 of the Bulletin. Water conservation, use and development are needed in paddy and other food and non-food crops. The wastage in the use of the Cauvery, Tambraparni and the large rain fed water tank resources particularly in paddy cultivation has been computed at over 50 per cent. Water is being

used by our farmers beyond what is needed for growing paddy as a substitute for weedicide. Some simple control and education measures can make our existing water resources serve double the crop area now served. Further the wide and wasteful variation of the water intake of our land which varies from 3.2 to 20 c.m. per hour can be corrected by further and fuller use of both farm yard manure and organic wastes which we today throw away or mix in cattle fodder. Such wastes include rice husk, rice straw and maize stalk. Also the modernised water saving floor which the government is launching as part of its Rs. 78 crore intensive ground water scheme represents an important initiative. Experiments in the sandy tracts of Tirunelveli have shown that the construction of a floor made of thatch, hard-wood, non-porous clay or even better asphalt one foot below the sandy surface saves sufficient water to grow three crops a year and nurture even that most water demanding crop, paddy. The cost of the water saver is around Rs. 4000/- per acre, which might be reduced by using machines for laying asphalt at a cost of Rs. 2250/- per acre. The formation and spread of irrigation co-operatives and the 6000 agro-service centres which, among other tasks, will use and service all the equipment employed in the water development programme should contribute to spreading the agricultural transformation. With regard to the other two components, fertilizer use and supplies are dealt with under the industrial section, while the required credit input was analysed in the last issue of the Bulletin (No. 7).

Pulse and cotton production is receiving special attention in the country, and in the State. The shortfall in pulse production is a serious All-India problem. The total production is both limited and declining. In Tamil Nadu we are particularly badly off, producing less than one lakh tonnes out of 8 lakh tonnes that we consume. Hence the current concentration on pulse production with the aid of the Central Government is sound. The programme will bring 5 more acres under intensive cultivation, so that pulse farming will cover 23 acres in the State. In the Rs. 4 crore All-India scheme for intensive cotton development, Tamil Nadu carries heavy responsibility as it has been allocated the largest share—Rs. 67 lakhs—for rapid increase in the quality and quantity of cotton output. The State programme is concentrated

in the four Districts of Coimbatore, Salem, Tirunelveli and Ramanathapuram. The target is to produce enough of the long staple variety so that in three years the needs of our mills can be met. In this connection it is somewhat disheartening that one central ministry has to appeal to another so that the programme of cotton development undertaken by it is not frustrated by the credit margins offered by the public sector banks in regard to cotton and textiles. There is a more general lesson to be drawn here for the country. In the economic field, the country cannot afford the present and past situations where development or growth action by one ministry or government department is defeated by uncoordinated action by other ministries. Our continuing development calls for all departments of Government following a consistent set of policies. The formulation of such strategy and even more monitoring its being followed by the government departments might be assigned as one of the major tasks of the Planning Commission.

Hybridisation is moving from food crops like paddy and cumbu and cash crops like cotton and groundnuts to horticulture, a relatively neglected area in this region. Tamil Nadu and the South generally face a relative lack of variety of fruits in the market. Bananas and oranges are a year round product and mango the major seasonal fruit. There is need for research concentration experimentation and popularisation, of the results of hybridisation in our horticultural resources to increase the supply and range of our marketed fruits. The most recent cross breeding of the mango fruit in Kerala of which hybrid 45, 56, 87 and 151 are now being commonly grown should spread to other seasonal and non-seasonal fruits.

Our forestry resources are limited. The All-India norm is one-third of the available land. In Tamil Nadu our forest lands are half of that norm, being 16 per cent. Here again a forest policy is needed which will not only conserve and extend the area but make its development as a major responsibility of farmers. The farming community will take up the responsibility for growing bamboo clusters, casurina groves and hard wood trees, provided their cultivation pays off. For this, links should be established between the farm output and the factories and plants

which use them as raw materials. One of the most serious forest problems in the State is the continuing encroachment on forest lands. (In Western countries, the equivalent problem is fire hazard and damage). In one district alone, Madurai, 75,000 acres have been encroached not only by landless labourers but more by rich farmers. This must now be stopped. The ceiling on land restricting it to 15 acres per family in wet and 50 acres in dry areas now adopted by the State might contribute to rescue some of these forest lands which need to be urgently developed and made paying.

Animal husbandry is another area calling for concentrated action in the State. The overall position with regard to cattle, sheep, piggery and poultry is unsatisfactory. The cattle population with the ratio of 1 : 3 in relation to the human is unviable and a planned programme of reduction in numbers is a first priority. This is a socio-cultural issue, in which all who can promote the cultural change should co-operate. The State plan to import 95 quality stud bulls to speed cross breeding, the development of stall feeding of such cross bred cattle in a State where land is not available for fodder, the development of the one crore Alamadi buffalow farm as pilot dairy farm are moves in the right direction. Milk co-operatives are an important link in the chain to improve the quality of cattle. Our record here again is poor; Of the 2588 registered Milk Companies in the State, less than half are functioning and over 75 per cent are in the red. The societies can be an important means for increasing the number of farms, improving the breed of milch cattle and bringing the output of milk nearer the growing demand.

Fisheries are another area where we are lagging. Despite an impressive and attractive 1000 mile coast line, even the basic fishery survey of this vast area has not been attempted. The State priorities in this are a Fishery Survey of its vast sea-board, a study of the ecology of fresh water reservoir resources on which a start is being made in Bhavanisagar, and equipment and training for the fishing industry. The use of mechanised vessels and trawlers for deep sea fishing and the training of fishermen in these large capacity vessels will make the 3 crore fishing harbour project in Madras viable. The harbour will provide facilities for 50

trawlers and 400 mechanised boats, of which we have almost none today.

In the whole area of agriculture, animal husbandry, forestry and fishery there is need for co-ordinated research in the State. For this purpose the Agricultural University and its various research stations and the newly formed State Agricultural Council might well follow in the 'traditions of the Indian Council of Agricultural Research in co-ordinating, activising, financing and generally promoting the much needed research effort in this key area.

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Industrial Progress:

Despite the agricultural transformation during the last four years in the country, the research bureau of Economic Times computes that during the last 15 year period, 1955-56 to 1969-70, the agricultural sector's share in the country's real net domestic product declined from 54 per cent to 43.7 per cent, while that of manufacturing increased from 18.1 per cent to 22.9 per cent and that of the tertiary sector jumped from 27.9 per cent to 33.4 per cent. Tamil Nadu's in the relative shares show a decline from 49.1 per cent to 43.4 per cent in agriculture, a rise from 16 per cent to 21 per cent in manufacturing and from 34.9 per cent to 35.5 per cent in the tertiary sector during the period 1960-61 to 1969-70. During the second half of this period, the net real income of the State increased annually by 5.44 per cent, with a per capita increase of 3.08 per cent.

Developments at Manali where a major petro-chemical complex for the country and the State is emerging are the current industrial highlight. The Manali complex includes : (a) the giant fertilizer plant, (b) the oil refinery and (c) three petro-chemical plants for producing transformer oil, polyester fibre and carbon black. In issue No. 6 of the Bulletin and earlier under agricultural trends in this issue, attention has been called to the key role of fertilizer use in the State's agricultural transformation and the relatively poor record in this State of fertilizer supply and

demand. Of all the inputs for high yielding food and cash crops, chemical fertilizers are the most important. Now the State and the South are equipped to supply the needed chemical nutrients through the Madras Fertilizer Plant which has just started operation at Manali. It offers the farmer a variety of combinations, a single nutrient in urea or a combination in NPK, nitrogen, phosphorus and potash. Now to make up our lag, what is needed is the popularising of this fertilizer supply among our farming community. Incidentally the Manali plant is one more example of the barrenness of the controversy as to which comes first, investment in industry or agriculture, to start a country on its path to self sustaining growth. One feeds into the other and this interlocking of agricultural and industrial undertakings is the only sure basis for sustained development. The 65 crore plant is a joint sector enterprise, the government contributing 51 per cent of the capital and Amaco the rest. The plant has been built largely with indigenous equipment, the two steam boilers from Bharat Heavy Electronics, Tiruchirapalli and other complex and miscellaneous machinery produced by local firms. The major raw materials, phospheric acid and potash have to be imported, while the other input, naphtha will be supplied by the neighbouring oil refinery. The plant will be the largest single stream ammonia unit in the country with 750 tonnes stream a day, using the largest single stream urea reactor, 885 tonnes a stream a day, and the largest chemical combination NPK plant, 1100 tonnes a day in two streams. The second component of the complex, the oil refinery now becomes an important input with an assured and profitable market. The third component is the 4 crore carbon black plant with a 30 million lbs. capacity. Its raw material also comes from the neighbouring oil refinery and its product will be used in the tyre and rubber goods industry. When in full production next year, the plant will save the country 2½ to 3 crores in foreign exchange.

The other important development is progress in setting up a similar fertilizer complex in Tuticorin. This 63 crore joint sector project is awaiting final approval of the Union Government, particularly in regard to its 40 crore foreign exchange component. The plant can be completed within a little over two years after

approval and will produce ammonia, urea, phosphate, sulphuric and phosphoric acid of over 4000 tonnes daily. It will supply the ammonia synthetic gas needed by the Kalpakam nuclear power station and so make nuclear power competitive in the State at 6 Paise a unit. Further a 66 thousand tonnes soda ash and ammonia chloride plant is being established in the area by the Tamil Nadu Industrial Development Co-operation which will depend on the fertilizer complex's surplus ammonia and the salt available in the area, for its raw material. Salt production in the 8000 acre Tuticorin area is now around 7 to 8 lakh tonnes and this could be increased to one million tonnes. The need to increase salt production and assure a regular export outlet particularly to Japan is linked with the plan for the construction of the new Tuticorin harbour which should not be delayed any further. Here again is a well planned and integrated industrial complex necessary for our agriculture, power and expoit undertakings, feeding and relying on a number of other manufacturing plants, to push forward the region's total development.

The expansion of Madras harbour facilities is linked to the export trade of the country and the State. The most immediate pressure point is the export of iron ores from the Madras harbour which is being expanded to provide facilities for 70,000 tonnes carriers at a cost of Rs. 9 crores. For another Rs. 3 crores these facilities can be further expanded to accommodate 100,000 tonnes carrier and so make Indian ores competitive in the Japanese markets. The real bottleneck is not finance but poor planning and lagging execution of the harbour expansion. This loss of momentum comes at a time when the State has registered a record increase in its exports last year, by over 23 per cent constituting 19 per cent of the total exports of the country.

Other developments in the State are the plan for increase of lignite mining, both expanding the existing one and opening a new one at Neyveli, a Rs. 25 lakh zari manufacture plant at Kancheepuram to meet the Rs. 1 crore gold zari demand by the State silk handloom weavers which is currently met from Surat, the proposed oil survey in the South Arcot, the expansion of Asok Leylands into heavy duty goods and passenger vehicles, the improved performance of Binny's and the opening of three rice bran village

industries mills and five rural industrial estates in Sriperumbudur, Omalur and Nanjuberi.

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Housing Needs and Programmes :

Official surveys record that 90 million families in the country (10 million urban and 80 million rural) have no houses. Despite our pride and tradition in social and personal hygiene, 70 per cent of existing houses have no bath-rooms or latrines. So, for the country we need 90 million houses which will cost Rs. 33 thousand crores. In Tamil Nadu we need 6 to 7.5 million houses at the cost of Rs. 2,500 crores. It is well that we bear in mind the dimensions of the problem so that we may act with commensurate firmness and urgency. The State government's construction of 10,000 tenements which could clear 50 out of 600 slums, the housing board's development of housing colonies for middle class families the legislation to vest ownership in the occupants of house sites and houses built by farm workers on lands of large landlords, the scheme to subsidise housing sites to the rural landless, the three care homes for the city's 8,000 beggars which would ultimately reach out to the 60,000 in the State, and the 20 year Rs. 940 crore master plan for the city, with its phased programme which starts with Rs. 185 crores for the dispersal of the population and industries in satellite towns and industrial zones spread over a 450 square mile area,—all these are not only means of alleviating the problem, they are the right way to break down a vast and intractable problem into manageable parts with phased action programmes for each. There are two other measures that need to be developed and executed. The first is to enlarge the existing revolving fund by inviting loans, grants and subscriptions from a wide variety of business firms, financial institutions and individuals. The second is for the towns and cities to plan an expanding use of their ownership of land as a means of financing the housing needs of their localities.

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Commercial Banking Expansion :

The most recent survey of deposits by the Reserve Bank of India shows for Tamil Nadu some positive and negative trends. In the State there are 1208 functioning offices and 1175 reporting offices of the commercial banks. As far as the number of bank offices is concerned, Tamil Nadu is the second most well served State, being surpassed only by Maharashtra, which has 1311 functioning and 1280 reporting offices. But the total deposits of Maharashtra is over four times that of Tamil Nadu, Rs. 129718 lakhs versus Rs. 30815 lakhs. Three other States with half the number of offices as Tamil Nadu have up to double Tamil Nadu's deposit intake. West Bengal with 592 and 569 offices has Rs. 73776 lakhs, Gujarat 919 and 897 offices has Rs. 45273 lakhs, and Uttar Pradesh with 923 nnd 864 offices has Rs. 42143 lakhs in deposits. Tamil Nadu's Commercial Bank Offices need to intensify their deposit mobilisation programmes before expanding their numbers further. At present we have in the State the highest costs per Rs. 1,000/- deposits. As between districts some of the offices hastily established in Thanjavur, North and South Arcot, and Tirunelveli need to be made more active or closed. The distribution of commercial bank advances against various kinds of security indicate the strong position of food articles followed by sugar, industrial raw materials, textiles, engineering and fertilizers being about in an equal position. In the three months, December 1969 to February 1970, covered in the survey there is a relative stagnation in the State in bank advances against industrial raw materials and an actual decline in that for engineering products and fertilizers, compared to the Maharashtra distribution. These are short term and useful pointers to commercial and industrial policy action aimed at speeding in a co-ordinative manner the industrial, commercial and agricultural movements in the State.

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Education :

As the school and university year commences, there is on the one hand a massive and unrelenting demand for education in urban and rural areas in the State and in the country. Principals,

headmasters and teachers have been inundated with pleas and pressures from students, parents, relatives and friends for admission into the institutions. In this State the most insistent demands have been for medicine and engineering. On the other hand the government has reduced the intake into these institutions to prevent further increase in unemployment. In Science streams the laboratory and equipment constraints have limited admissions. The results have been a period of great stress and strain when the limited and reduced facilities have come up against the inexorably expanding demand. The familiar critique offered by the developed countries that the governments of developing countries are only interested in the quantitative expansion of education at the expense of quality is based on an uninformed analysis and hasty generalisations. In fact the government's policy in restricting education in order to meet immediate problem of trained manpower surpluses may have serious consequences in the field of civil engineering at the end of the seventies as pointed out in the last issue of the Bulletin (No. 7). Similar bottlenecks are likely to arise in the field of rural health services. The explosion of education is the combined results of the democratic and insistent demands of parents and their children, with governments standing by somewhat helplessly.

There is more than an accidental relation between the educational explosion referred to and the educational reforms programme announced by our neighbour, the government of Ceylon and that proposed in the Lok Sabha by our Minister of Education. The basic aims of both proposals are to make education more practical, more vocational, more job oriented, and restrictive at the higher level. The Ceylon Reform comprises the following: (a) School admission is raised from five to six years of age and the five year primary school will emphasise environment of studies and creative skills and not book knowledge; (b) the junior secondary school from Grade 6 to 9 will have a common programme in both urban and rural areas consisting of languages, science and work experience in local occupations, e.g., fishing, vegetable cultivation, cocoanut industries, etc. This school stage will end with the national school certificate; (c) the high school years in Grade X and XI will be job oriented, admission being restricted on the basis of a quota given to each area; (d) only the qualified and

provenly apt will be admitted to the university which is to become a single one in place of the present four, as a means of saving on the duplication of costly faculties, and the unplanned training of skilled personnel, with the resulting high rate of graduate unemployment. Here again short term pressures find expression in the curricula at the lower level and intake restrictions at the higher level, which may not correspond to the country's long term development needs. Education is an industry with the longest gestation period, with little manoeuvrability in its current streams of production. The reformed products may result in such short supply of skills in the 15 year period when they come on the market that the country's development may be seriously hampered.

The 5 point Indian programme now being put into operation has the following aims : (a) In order to further the programme of free primary education, Rs. 25 crores is provided in the Union Budget to employ the educated unemployed as teachers for the backward regions. In Tamil Nadu as pointed out in the last issue of the Bulletin (No. 7), the problem is not to increase free primary education which is near the 100% target, but to improve the holding power of our primary schools which have a drop out rate of 50 to 60 per cent. Further in the State with all teachers of primary and secondary levels being trained, the problem of teacher unemployment has given rise to the system of apprentice teachers and a 50 per cent cut in the intake of teacher training institutions over the last five years. (b) Ten thousand annual scholarships are to be awarded to identify talent in the rural schools. This is a much needed initiative as the current constraint in the country's economy which is poised for a high rate of growth is managerial and innovative talent. (c) A provision of Rs. 50 lakhs is made for further development of play-grounds and recreation in schools. Physical education is a neglected area as the school uses every available bit of space for class room purposes. The financial provision however is wholly inadequate for the dimensions of the country and its problem. It must be supported and supplemented by local efforts. In this connection, the Tamil Nadu Youth Corps programme which will work on developing recreational facilities is one such supplementary move. (d) In order to expand and intensify the education of scheduled

castes and tribes, a country-wise, State by State, study and appraisal of the education of this sector of the population is to be made by the Indian Council of Social Science Research. The Madras Institute of Development Studies will be involved in the relevant depth study in Tamil Nadu. (e) The primary and secondary education courses are to be vocationalised through making work experience a part of the school programme. More specifically the proportion of students in secondary vocational courses are to be increased from the current 10 to 50 per cent of the total enrolment. In implementing this much needed change, the proposal for a technological university in the State to which all technical education institutions will be affiliated need to be reviewed. All education must be vocationalised and this might involve not continuing and intensifying the present sharp distinction between academic and work oriented education. A further all-India programme approved by the Legislature is to make 10 million adults literate in 33 districts in the country during the remaining three years of the Fourth Plan. In this State and Kerala what is needed is not a pilot effort like this, but a planned massive effort to educate its illiterate adults. In Tamil Nadu the five year functional literacy plan can be put into effect to remove illiteracy in the State. The Youth Corps in the State can make an important contribution to its realisation.

The Unesco Manram in the State has developed into an educational mass movement, with urban and rural teachers and students actively engaged in educational work activities inspired by Unesco's General Conference decisions. The Manram has branches in every one of the fourteen districts in the State and its active and imaginative President, Thiru K. Arivazhakan, and his devoted band of workers provide the focus and direction of the movement. In August the annual meeting of the Tirunelveli Unesco Manram was held in St. Xavier's College, Palayamkottai at which the results of the Manram's programme during the International Education Year was reviewed, merit certificates for creative artists and educators awarded and the programme for the current year established. Also in August, the Unesco Manram of the Madurai District held its annual celebrations at St. Justin's Teachers College, Madurai at which merit certificates were distributed to a dozen teachers and students for out-

standing educational achievements and a programme of action during the current year in support of the United Nations fight against racism and *racial discrimination discussed with the request* to its officers to develop a detailed group of activities.

The Tamil Nadu branch of the National Council of Women in India also organised in August a discussion meeting to celebrate the United Nations International Year for action to combat racism and racial discrimination. The political, economic, religious and scientific background to this action was the subject of review and discussion. The call to people in the State for educational, economic and political action to combat racism and racial discrimination was highlighted. It was also suggested that *a similar review of problems of discrimination within the country* should be the subject of separate and intense review and discussion.

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Statistics and Their Use

The limitations of our statistical computations (in which the Bulletin seems to abound) are vividly brought to mind in a recent announcement that the economic cost of a baby in India is Rs. 4,000/- and that Rs. 50/- spent on family planning is equal to Rs. 500/- spent on the economic development of the country. The intention behind these calculations will be generally accepted. It is obvious that an effective population control programme would move per capita income growth in a growing economy a little faster. We have however become used to expressing both simple and obvious truths in statistical terms in order to clothe these truths with a certain air of exactness. They do not and cannot possess such exactness because of the subjective element in the basis of all computations and the margin of error that computations include. The Time Essay writer in a recent issue calls attention to the wide and spreading use of imaginary numbers borrowed from higher mathematics in everyday life. An imaginary number is a multiple of the square root of minus one. In extending this technique to economic and social life, we will do little harm and some good as it provides a short cut to knowledge and understanding provided we do not forget that it is a simula-

tion of reality which cannot be simulated, that it gives the illusion of mastery and control over life which cannot be mastered and controlled.

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The Investment Habit :

The Federation of Indian Chambers of Commerce and Industry ran a timely and well prepared All-India Seminar in the City on the spread of the investment habit. The immediate problem that the Seminar faced is seemingly simple. Today there are 6,200 public limited companies in the country with a share capital of Rs. 1700 crores contributed by 5 lakh shareholders in a population of 547 million (In the United States by comparison there are 2.5 crores shareholders in a population of 250 million. In U. K. and Western Europe there are 20 to 40 lakh shareholders). In order that our industry may grow at 15 per cent per annum in the seventies, Rs. 100 crores need to be mobilised annually, through equity shares. Mobilisation of resources at this rate would mean trebling the present effort. To attain this rather modest goal, a number of measures were proposed. There was unanimous agreement that the spreading of the investment habit through equity shares subscription must rely as its major source on the rural sector, with its fast accumulating tax free surplus resources. There was also a wide ranging concensus as to the fiscal and credit policy to attain this objective that needs to be followed by the Central and State Governments, the Reserve Bank of India, the public sector banks, the other financial institutions and the stock and share markets which need to widen their geographical scope. There was some difference as to the optimum debt-equity ratio that companies should adhere to. There was wide ranging agreement however on the need to manage companies in such a way that their dividend declarations make their scrips and shares competitive and investment promotive.

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Seminar on Consumer/User Oriented Research :

Preparatory arrangements for the three days' Seminar to be held in the Presidency College, Madras from September 17 to 19 are complete. On the first day there will be 10 presentations followed by discussion of the research needs of the consumers–the public and private sector managers and Secretaries of Government Departments, executing the Fourth Plan of Tamil Nadu. On the second day there will be a review of the three remaining years of the Fourth Plan by researchers from the three universities and the research institutions in the State with a view to identifying research themes in light of the expressed needs of the consumers. On the last day there will be established a list of research priorities in Tamil Nadu development for the years 1971–72 to 1973-74 and the broad lines of division of the themes among the research specialists. Of the 40 participants invited to the Seminar, as at 1st August, 30 have indicated acceptance. The background and working papers of the seminar will be circulated to the participants on September 1.

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August Madras Development Seminar :

The August Seminar paper, "The problem of suburbanisation" by Dr. C. T. Kurien, Professor of Economics, Madras Christian College, Tambaram together with a brief resume of the discussion of the paper in the Seminar appears as the main article in this issue.

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The Second Article :

A second Article on "Improving Polytechnic Education in the South" also appears in this issue.

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Correspondence :

Letters referring to some of the issues discussed in the current or previous numbers of the Bulletin are published in the correspondence section.

"PROBLEMS OF SUBURBANISATION"

By

DR. C. T. KURIEN,

Professor of Economics, Madras Christian College, Tambaram, Madras-59.

This paper is mainly an exploratory study and is meant to pose some questions which require further research and study. Since it is exploratory in nature, I have made use of whatever material has been readily available to me without making an extensive survey of the literature on the subject. In many places I have also resorted to the technique of casual empiricism supplementing published information with direct observation. It goes without saying that for one who lives and works in Tambaram suburbanisation is an existential problem.

The paper is divided into three sections. In Section I, I summarise the evidence available, mainly from Census Reports, about the nature of urbanisation in the country in general and in Tamil Nadu in particular. In Section II, I turn to the specific problems of suburbanisation and the characteristics of suburbs around the main cities of Tamil Nadu. The discussion in this section is geared to the formulation of a hypothesis about the nature of suburbs in our State and possibly in other parts of the country. Section III spells out the implications of this hypothesis to the future pattern of the growth of cities, towns and metropolitan areas and indicate the type of studies required to test the hypothesis fully. It may be possible to undertake some of these studies as soon as the detailed reports of the 1971 Census become available. I am also aware of the possibility that the reports of the latest census may make the study completely obsolete. On the other hand, it is just likely that the problems dealt with in this paper cannot be answered without further empirical studies even after those reports become available. In the meanwhile, most of the data contained in this paper are taken from the 1961 census reports.

I. The Urban Structure in India and Tamil Nadu :

If concentrations of more than 2500 persons are termed " urban ", only less than 18 percent of the total population of India comes under the category of urban dwellers. Slightly over 82 percent constitutes rural population. This distinction is sometimes used to imply a rather sharp polarisation between "cities" and "villages" in the country. But the fact is that the urban population is fairly evenly spread across different sizes of towns as indicated in Table. 1

TABLE I

Distribution of the Indian Population by Place Sizes: 1961 Census.

Place Size.	*Names of places*	*Percent of total population.*
Upto 2,500	558,088	82.16
2500 — 19,999	2,509	4.27
20,000 — 49,999	375	3.22
50,000 — 99,999	110	2.47
100,000 and over	73	7.89

Source : Census of India, 1961.

It is interesting to note also that by international standards we do not, or do not yet have an excessive concentration of population in the biggest cities of the country. In 1960 we had 4.4 per cent of our total population living in the largest cities and 3.2 percent living in the five largest cities. A comparison of our situation with selected countries of the world is shown in Table 2.

TABLE 2.

Large City shares of total population in selected countries, 1960.

Country		*Percentage of total population living in*	
		the 5 largest cities	*the 10 largest cities.*
India	...	3.2	4.4
United States	...	9.6	12.1
United Kingdom	...	13.7	17.8
West Germany	...	12.0	17.6
France	...	9.9	12.2
Italy	...	10.2	13.5
Japan	...	16.3	19.7

Source : U.N. Demographic Year Book, 1961.

Tamil Nadu has a much larger proportion of urban population, 26.69 per cent, compared to the All India figure of 17.97 per cent. In fact, according to the Census of 1961 Tamil Nadu is one of the most urbanised states in the country, next only to Maharashtra whose urban population is 28.22 per cent of the total. Our urban proportion is also considerably higher than those of our neighbours, 22.33 per cent in Mysore, 17.44 per cent in Andhra and the low figure of 15.11 per cent in Kerala. What is perhaps more impressive is the degree of urban concentration in Tamil Nadu. The five largest cities of Tamil Nadu, Madras (1,729,141), Madurai (4,24,810), Coimbatore (286,305), Tiruchirapalli (249,862), and Salem (249,145) together account for a little over 9 per cent of the total population of the State. However, the nine class I cities of Tamil Nadu, Vellore, Thanjavur, Tuticorin and Nagercoil, apart from the five mentioned above account for only slightly more than 10 per cent of the State's population. The distribution of the urban population of Tamil Nadu among the different sizes of towns is indicated in Table 3.

TABLE 3 :

Percentage of Towns in each class and Urban Population in each class–Tamil Nadu, 1961.

Class of Town		*No. of Towns.*	*Town.*	*Population.*
Class I	...	9	3.8	37.8
Class II	...	19	7.7	14.1
Class III	...	62	20.9	20.8
Class IV	...	118	33.5	18.1
Class V	...	94	28.2	8.0
Class VI	...	36	5.9	1.2

Source: Census, 1961, Vol. IX, Part II — A, p. 208.

1. The census classifies towns into six classes as follows:

Class I	towns with a population of over			1,000,000
Class II	,,	,,	between	50,000 and 99,999
Class III	,,	,,	,,	20,000 and 49,999
Class IV	,,	,,	,,	10,000 and 19,999
Class V	,,	,,	,,	5,000 and 9,999
Class VI	,,	,,	less than	5,000

Table 3 again confirms the high degree of concentration of the urban population in the bigger towns in Tamil Nadu. It will, of course, be noticed that the phenomenon of urban concentration is closely related to the leading position of the city of Madras which accounts for over 5 percent of the total population of the State, and more than 50 per cent of the population among the Class I towns in the State, As may be expected there is also considerable inter-district variation in the rural-urban composition of the population in Tamil Nadu. Table 4 brings out the picture clearly.

TABLE 4 :

Rural, Urban Distribution of Population and Density— Tamil Nadu, 1961.

	Percentage of Rural & Urban population to total population.		*Density per Sq. Mile.*		
	Rural	*Urban*	*Total*	*Rural*	*Urban*
India ...	81.69	18.31	358	297	5,305
Tamil Nadu ...	73.31	26.69	672	513	4,459
Madras District ...	—	100.C0	35,339	—	35,339
Chingleput ,, ...	79.25	20.75	696	574	3,696
North Arcot District ...	79.94	20.06	671	549	5,793
South Arcot ,, ...	87.13	12.87	724	648	3,645
Salem ,, ...	83.77	16.23	539	459	5,462
Coimbatore ,, ...	70.99	29,01	590	445	2,905
The Nilgiris ,, ...	56.06	43.94	417	320	679
Madurai ,, ...	68.37	31.63	660	466	6,517
Tiruchirapalli ,, ...	78.74	21.26	579	471	4,044
Thanjavur ,, ...	79.62	20.38	868	716	5,608
Ramanathapuram,, ...	75.25	24.75	502	388	4,409
Tirunelveli ,, ...	68.95	31.05	619	657	2,913
Kanyakumari ,, ...	84.95	15.05	1,564	1,341	10,599

Source : Census of India, 1961, Vol IX. P. 70.

Of special significance in connection with the examination of the problems of suburbanisation are the rate and pattern of the growth of towns over time. The methodological issues involved in the study of the growth of towns are controversial. In a recent study about the size, economic structure and growth of

Indian towns K. B. Suri has raised some of these methodological problems.[2] Taking the country as a whole it is clear that Class I towns have registered a much faster rate of growth in numbers during the present century. In 1901 there were only 25 such towns in the country which went up to 107 by 1961 registering a 328 per cent increase. Class II towns increased by 216 per cent, Class III towns by 260 per cent, Class IV towns by 92 per cent, Class V towns by 10 percent and Class VI towns by -47 per cent over the same period. The total number of towns went up from 1,917 in 1901 to 2,700 in 1961, i.e. by 41 percent.[3] More or less the same pattern is seen with respect to variation in the population also as seen from Table-5.

TABLE 5:

Change in population of Towns classified by size, 1931-41, 1941-51 and 1951-61.

Class of Towns	*Percent variation in population during*		
	1931—41	*1941—51*	*1951—61*
Class I	+ 72.1	+ 68.8	+ 48.0
Class II	+ 37.8	+ 33.2	+ 25.0
Class III	+ 21.9	+ 37.9	+ 41.7
Class IV	+ 17.4	+ 21.6	+ 20.5
Class V	+ 16.5	+ 21.2	— 25.5
Class VI	— 18.5	+ 2.0	— 57.3
All Towns	+ 33.2	+ 41.4	+ 26.4

Source: Census of India, 1961, Vol. I, India, Part II—A (i).

It again appears that the higher size classes grow at a much faster rate. In the decade of 1931-41, particularly, the relationship between town size and growth is both clear and positive. The other two decades also witnessed the largest per cent increases in the population of Class I towns, though there are a few deviations from the trend. But calculations of this kind based on the "instantaneous method" are open to serious criticisms. In the instantaneous method one simply looks at the size classes at two

2. K. B. Suri: "Towns: Size, Economic Structure and Growth", *Economic and Political Weekly*, August 10, 1968.

3. Census of India, 1961, Vol. I, India, Part II — A (i).

points of time, say 1951 and 1961 to calculate the percentage variations over time. But the method does not make any allowance for towns of lower classes graduating into higher classes over the period. The growth in the population of class I towns between 1951 and 1961 not only shows the increase in the populations of towns which were of the Class I category in 1951, but also the addition to population in the Class I category resulting from more towns coming into this category between 1951 and 1961. A more accurate procedure will be to adopt the "continuous method" whereby cities and towns are arranged according to their populations at some point of time and the growth of each of these towns is observed over time. Since the census usually follows instantaneous method some retabulations are necessary to apply the continuous method. Reproduced in Table 6 are the changes in the population of towns in India retabulated and calculated by Suri according to the continuous method.[4] The changes noted according to the instantaneous method are also given for comparison.

TABLE 6:

Changes of Populations of Cities and Towns classified by their populations at the beginning of the Decade, 1951-61

Size category.	*Percent change in population*	
	Continuous Method	*Instantaneous Method*
Class I	+ 30.7	+ 48.0
Class II	+ 30.3	+ 25.0
Class III	+ 26.5	+ 41.7
Class IV	+ 25.6	+ 20.5
Class V	+ 26.7	— 25.5
Class VI	+ 50.5	— 57.3

Source: Adapted from K.B. Suri : " Towns : Size, Economic Structure Growth ", *Economic and Political Weekly*, Aug 10, 1968.

Table 6 has some very significant findings. In the first place it negates or at least corrects the impression given by Table 5 that the growth of towns is strongly and positively correlated with their

4. K. B. Suri, Loc. lit,

size. Secondly the negative changes observed under the instantaneous method and the significant positive change noted with the continuous method for Class V and Class VI towns emphasises the "graduation" process referred to earlier. Both these findings are of special significance in the study of suburbanisation and reference to them will be made in the subsequent sections. Before turning to those issues, however, this section may be wound up with some more general observations about the pattern of urban growth, especially in Tamil Nadu.

During the decade of 1951 to 1961 Tamil Nadu registered one of the highest variations of the proportion of urban populations to total popoulation. It increased from 24.35 per cent in 1951 to 26.69 in 1961 indicating a variation of 2.34 points. Maharashtra which was the most urbanised State in India in 1951 with an urban population of 28.75 registered a *negative* variation of 0.53 points, although, as already noted with a 28.22 urban population it still retained its first place in 1961 as well. Gujarat which was the second most urbanised State in the union in 1951 with an urban population of 27.23 also registered a *negative* variation of 1.46 points during the decade, and lost its second position as well. In 1951 there were only five States with an urban population of more than 20 per cent of the total population, Maharashtra, Gujarat, Tamil Nadu, West Bengal and Mysore in that order. It is interesting to note that over the decade of 1951-61 only Tamil Nadu and West Bengal registered a positive variation, with Mysore also showing a negative variation. Tamil Nadu, however, did not show the highest variation. The highest variation was registered by Assam whose urban population increased from 4.65 per cent, of the total population to 7.69 per cent, a positive variation of 3.04 points. The second highest variation was that of Jammu and Kashmir whose urban population increased from 14.05 per cent in 1951 to

5. To prove the point further Suri splits up Class I towns into five subclasses applying the same test to these groups. He further takes into consideration towns with a population of 20,000 and over. The conclusion he draws from these examinations is as follows: "The use of the continuous method for measuring urban growth ... has shown that the size of urban locality is not an important determinant of their population increases . . . It seems pertinent, therefore, to identify other factors which could have influenced the growth of urban population", K. B. Suri, *Loc. lit.*

16.66 per cent in 1961, a 2.61 point positive variation. Tamil Nadu's was the third highest variation. Our other neighbours, Kerala and Andhra Pradesh registered positive variations of 1.63 and 0.02 points respectively. The variation of West Bengal was only + 0.57. From these figures again it would appear that the growth of urban population does not depend on the size of the urban population.

With these general observations we may now turn to an examination of the problems of suburbanisation in our State.

II. "Suburban" Towns in Tamil Nadu.

Suburbia is dream land. There dwell the cream of the urban citizenry in their quiet homes far from the madding crowd. The streets are clear, the gardens are pretty. There is nothing there of the rush and bustle of the work a day world. All is calm and all is clean.

If such be the mental image about suburbs, in Tamil Nadu (and possibly the rest of India) they exist only in dreams. This is the burden of my paper. The characteristics of the "suburbs" in our context are very different from the images we carry in our minds. To demonstrate this we must search for the technical definition of "Suburbs". In fact "suburb" is a lay man's term. In the technical sense suburbs can be defined only in the context of what the UN Demographic Year Books describe as "Urban Agglomerations" and what are called "Metropolitan Areas" in the United States and "Conurbations" in the United Kingdom. An agglomeration is defined as "an area which by the economic structure of its population forms a more or less homogeneous, predominantly non-agricultural geographic unit, and whose population to a prevalent or at least considerable extent find its livelihood directly in places of employment within the central city."[6] The term "Conurbation" appears to have been first used in the early years of the century by P. Geddes in his *Cities in Evolution* (1915) to refer to "city-regions" or "town-aggregates" such as

6. From Olad Boustedt's paper presented at the World Population Conference, 1954 as reported in Jack P. Gibbs: *Urban Research Methods*, Van Nortvand Company, New York, 1961. p. 43. I rely on Gibb's book for the definitions that follow.

Greater London. He did not define his concept of conurbation in any detail, but C. B. Fawcett who studies the problem in some detail during the inter-war years gave the following definition to the concept: "'a conurbation is an area occupied by a continuous series of dwellings, factories and other buildings, harbour and docks, urban parks and playing fields, etc., which are not separated from each other by rural land; though in many cases in this country such an urban area includes enclosures of rural land which is still in agricultural occupation." The Royal Commission on the Distribution of the Industrial population (1940) felt that Fawcett's definition placed too much emphasis on bricks and mortar as constituting the link and that, while in many cases it might be adequate, in others a better test would seem to be how far out from a given centre industry or industrial population looked to that centre as essential to its life and as the focus of its business activities. Gradually the concept has come to denote aggregates of local authority areas.

It is correct to say that the evolution of the concepts of agglomeration and conurbation has been greatly influenced by the needs to compile statistics about the distribution of urban populations. From this point of view the most elaborate definitions of urban aggregates have come from the statistics-conscious Americans. With various government and private agencies compiling statistics about urban areas it was soon clear that for many types of social and economic analysis it was necessary to consider as a unit the entire population in and around the city whose activities form an integrated social and economic system. Consequently the Bureau of the Budget has now laid down the norms to identify the standard metropolitan statistical areas (SMSA's). According to these some of the main characteristics of SMSA's are :

1. Each SMSA must include at least one city with 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000).

2. At least 75 per cent of the labour force of the counties constituting the SMSA must be in non agricultural occupations.

3. At least 15 per cent of the workers living in the given outlying country must work in the county or counties containing the central city or cities of the area.

Certain general characteristics of urban aggregates emerge from those definitions: these are size, occupational characteristics of the labour force and the nature of relationship between the central city and its "suburbs". Of these the first two are essentially features of urbanisation. Consequently it is the third that constitutes the distinguishing aspect of suburbanisation. In fact all the definitions and descriptions of urban aggregates are based on a certain type of relationship between the central city and its surrounding towns or between the different sections of the metropolitan area. The nature of this relationship was spelled out by R. D. McKenzie in one of the earliest studies on metropolitan areas. He defined the metropolitan area as "an open regional community composed of numerous territorially differentiated, yet inter-dependent units of settlement".[7] Following McKenzie's work there have been numerous studies of the interdependence of the local communities in the metropolitan area surrounding the centre. Many attempts have been made to map the specific functions of the various localities within the metropolitan area. Most of these studies describe the metropolitan area as organised from the dominant centre into an axiate pattern of inter-dependent component units. One of the most familiar of these is the representation of the metropolitan area as consisting of a number of concentric circles with the down town area of offices, banks, stores and other business concerns—also referred to as the Central Business District—constituting the innermost circles, with the manufacturing and warehousing circle coming next to it, the housing area of "suburbs" still further out surrounded on the periphery by a belt of agricultural land which sets the boundaries of the metropolitan area. This is, of course, only a schematic representation and it is not expected that all metropolitan areas will conform to this pattern. What is important here, however, is not the pattern itself, but the basic point that lies behind the pattern-that a metropolitan area is essentially a *territorially* and *functionally* differentiated space. Where these characteristics obtain it is natural to expect that central cities will be losing large numbers of residents to the suburbs throughout migration. A study of Standard Metropolitan Areas in the United States be-

7. R. D. Mc Kenzie: *The Metropolitan Community*, New York: Mc Grow—Hill, 1933, p. 69.

tween 1940 and 1950 did in fact show that the average loss of population for central cities through net migration was 1.8 per cent, while the average gain for the metropolitan suburban rings as a result of net migration was 26.4 per cent.[8]

One of the main contentions of my paper is that such territorial and functional differentiation presupposed in the concept of urban agglomerations or conurbations is largely absent in our context. And my plea is for a new characterisation of the relationship between central cities and their suburbs. I turn now to a detailed examination of urban aggregates in Tamil Nadu.

The 1961 Census Report recognises 18 conurbation zones in the State. The approach to the conurbations has been very pragmatic. The author of the Report (Vol. IX, Part I-A (i)) describes the procedure adopted in identifying the zones: "A map of the State showing the towns represented by dots, whose sizes depended upon their populations was prepared. By eye-judgment and some close study of the map, I have delineated district clusters of cities and towns of different size classes .. A ring was drawn round each cluster, taking care to see that there was some free space of non-urban or sparse urban area around each cluster. By such a process, the 18 conurbation zones were located in the State" (p. 174). This is not to say that the procedure was completely arbitrary although nothing like the American SMSA tests were applied in identifying the zones, But it is stated, rather vaguely again, that "What is necessary to treat a cluster of towns as a conurbation is that there should be one or more basic factors which knit these towns together in the daily life of the people inhabiting these towns. The cementing force need not necessarily be social. It may arise on account of the pursuit of some common industry or on account of dealing in a common business. It may even arise on account of the establishment of

8. Donald J. Boque and Emerson Seim : "Components of population change in suburban and central city population of Standard Metropolitan Areas: 1940 to 1950", Rural Sociology Vol. 21 Nos. 3-4, 1956, as reproduced in Gibbs, op. lit.

some institutions of a servicing nature, like hospitals, colleges etc.," We shall understand these aspects better when the different conurbation zones are identified. The zones are the following:

Zone 1. The Madras Metropolitan conurbation.
Zone 2. Vellore—Ranipet conurbation.
Zone 3. Vaniyambadi—Ambur conurbation.
Zone 4. Salem conurbation.
Zone 5. Erode—Bhavani conurbation.
Zone 6. Tiruppur conurbation.
Zone 7. Coimbatore conurbation.
Zone 8. Pollachi—Udumalpet conurbation.
Zone 9. Coonoor—Ootacamund conurbation.
Zone 10. Cuddalore conurbation.
Zone 11. Thanjavur—Kumbakonam conurbation.
Zone 12. Tiruchirapalli conurbation,
Zone 13. Madurai conurbation.
Zone 14. Cumbum Valley conurbation.
Zone 15. Karaikudi conurbation.
Zone 16. Tirunelveli conurbation.
Zone 17. Ambasamudram conurbation.
Zone 18. Tuticorin conurbation.

The conurbations consist of a primary city and its surrounding towns as in the case of Madras city, Salem, Coimbatore etc., or "twin-cities" and their neighbouring towns as in the case of Coonoor — Ootacamund and Thanjavur — Kumbakonam. The Madras Metropolitan Conurbation includes the City itself and 20 towns around it; Tirunelveli has only 4 towns included in the conurbation. In Table 7 I bring together some details about these conurbations.

TABLE 7

CONURBATIONS OF TAMIL NADU

S.No.	Name of Conurbations.		Total Population 1961	Main Town and its population.	Second main town and its Population.	3 as p.c of 2
	1		2	3	4	5
1.	Madras Metropolitan conurbation		1,944,502	Madras : 1,729,141	Tiruvottiyur : 33,371	89.2
2.	Vellore-Ranipet	,,	214,122	Vellore : 113,742	Arcot : 25,029	53.2
3.	Vaniyambadi-Ambur	,,	93,255	Vaniyambadi : 42,048	Ambur : 39,455	45.1
4.	Salem	,,	280,285	Salem : 249,145	Jarikondalam patti: 8,184	89.0
5.	Erode-Bhavani	,,	150,712	Erode : 73,762	Kumarapalayam : 24,757	44.8
6.	Tiruppur	,,	97,965	Tiruppur : 79,773	Avanashi : 9,796	81.4
7.	Coimbatore	,,	501,746	Coimbatore : 286,305	Mettupalayam : 36,496	57.0
8.	Pollachi-Udumalpet	,,	128,163	Pollachi : 54,369	Udumalpet : 28,345	42.4
9.	Coonoor-Ooty	,,	123,869	Ootacamund : 50,140	Coonoor : 30,690	44.7
10.	Cuddalore	,,	120,090	Cuddalore : 79,168	Nellikuppam : 22,168	66.0
11.	Thanjavur-Kumbakonam	,,	288,815	Thanjavur : 111,099	Kumbakonam : 92,581	38.1
12.	Tiruchirapalli	,,	368,940	Tiruchirapalli 249,862	Golden Rock : 43,120	68.8
13.	Madurai	,,	490,882	Madurai : 424,810	Madakulam : 19,209	86.7
14.	Cumbum Valley	,,	220,200	Bodinayakanur : 44,914	Periyakulam : 30,335	20.0
15.	Karaikudi	,,	95,645	Karaikudi : 43,698	Devakottai 25,524	45.7
16.	Tirunelveli	,,	190,048	Tirunelveli : 87,988	Palayamcottai : 51,002	46.3
17.	Ambasamudram	,,	112,072	Vikramasingapuram : 32,978	Ambasamudram : 22,447	29.4
18.	Tuticorin	,,	220,539	Tuticorin : 124,230	Udangudi : 15,267	56.4

Source : Census of India, 1961. Vol. IX, Part I — A (i).

TABLE 8

Major Conurbations of Tamil Nadu Growth of Population 1951—1961.
(State : 11.85 %)

S.No.		City	Suburbs +	Taluk of City	District.
1.	Madras :	22.1%	30.0%	22.1%	22.1%
2.	Vellore :	7.2%	14.2%	6.9%	8.5%
3.	Salem :	23.5%	11.0%*	18.3%	12.8%
4.	Coimbatore	45.0%	26.8%	29.8%	12.8%
5.	Thanjavur :	10.0%	— 2.0%	4.9%	8 8%
6.	Tiruchirapalli :	14.0%	40.0%	13.0%	8.4%
7.	Maduri :	16.4%	50.0%*	18.8%	11.0%
8.	Tuticorin :	26.0%	13.3%	13.1%	9.0%

\+ Only those suburbs included both in 1951 and 1961.

* Only one suburban town.

Source : Census of India, 1961 Vol. IX, Part I — A (i).

It will be noticed that the share of the population of the primary city ranges from 20 per cent (in the case of the Cumbum Valley conurbation)** In the case of 8 conurbations the share of the principal city's population is more than 50 per cent.

To go a little deeper into the problems of suburbanisation I have decided to concentrate on the 8 conurbations centering round the class I cities in the State (those with a population of over 100.000). These are Madras, Vellore, Salem, Coimbatore, Thanjavur, Tiruchirapalli, Madurai and Tuticorin. The ninth Class I city of the State, Nagercoil has no conurbations around it. In the case of all these conurbations except Thanjavur, the principal city accounts for more than 50 percent of the population. Thanjavur is an exception not only for this, but for many other aspects as well, as will become clear in the more detailed discussion that follows. Some relevant information about these conurbations are brought together in Table 8.

The Table reveals many interesting aspects. In the first place, all the principal towns, again with the exception of Thanjavur have registered rates of growth higher than that of the State during the decade of 1951 to 1961. Secondly the growth of population of these towns has also been generally more than that of the districts in which they are placed, the sole exception being Vellore. (Madras City, of course, is identical with its district). Similarly their growth has also been faster than that of their respective taluks with the exception of Madurai. All these are expected results because the towns usually grow faster than their neighbouring areas and the main cause for this is in-migration. More interesting will be a comparison of the growth of the suburbs with that of their principal cities. Here, there are some statistical difficulties. Population figures of all the suburbs for 1951 are not available in the Report of the 1961 census because some of these areas were not included in "urban areas" in 1951. In the case of the Madras Metropolitan conurbation. for instance, population figures for 1951 and 1961 are given only for, Kunrathur, Poonamallee, Tiruvottiyur, Tambaram, Alandur, Pallavaram,

** to 8.92 percent (in the case of Madras Metropolitan Conurbation)

St. Thomas Mount-cum-Pallavaram (cantt.) and Villivakkam, whereas for Avadi, Ambathur, Anakaputhur, Issa Pallavaram, Nakkundram, Erukkancheri, Palavanthangal, Koyambedu, Meenambakkam, Tirusoolam, Solaiyur, and Enanavur population figures are available only for 1961. Generally this is not a serious problem because most of the areas which gained urban states only in 1961 are very small towns with populations way below 10,000. (The exceptions to this within the 8 conurbations we are dealing with are Avadi and Ambathur in Madras; Suramangalam and Jarikondalampatti in Salem; Karamadi, Uppilipalayam and Madukkarai in Coimbatore; Madakulam and Avaniapuram in Madurai). The problem is serious in the case of the Madurai conurbation where out of the 6 suburban towns listed only one (Tirupparankundram) the population listed for both 1951 and 1961 and of the Salem conurbation where again only one suburb is listed in 1951 and 1961. These qualifications must be borne in mind while turning to the growth of the suburban towns given in Table 8. It will be noticed that in the case of Madras, Vellore, Tiruchi and Madurai the suburbs grow faster than the principal cities. In the case of Salem, Coimbatore, Thanjavur and Tuticorin the suburbs did not show a rate of growth as high as those of their principal cities. In fact, the suburbs of Thanjavur have registered a fall in population over the decade.

Nothing much can be inferred from these figures. The question to be raised is not about the rates of growth of suburbs as such, but about the kinds of suburbs that grew rapidly and those that did not or grew only little. Only such an examination will give us a clue about the nature of suburbs and the pattern and causes of their growth. I shall go into these questions with special reference to the Madras Metropolitan conurbation. Table 9 brings together some information about the suburbs of Madras, particularly the ones for which data are available both for 1951 and 1961.

TABLE 9

Population and Growth Rates of the Suburbs in the Madras Metropolitan Conurbation.

Name of Town	*Population* *1951*	*Population* *1961*	*Change in population*	*Density 1961 per sq. mile.*	*Type of Town* §§
Kunrathur	10,593	12,244	+ 15 %	n.a.	Industrial
Tiruvottiyur	22,393	37,571	+ 68 %	4696	Industrial
Poonamallee	20,677	11,900	— 42.4%	n a.	Residential
Tambaram	18,574	33,500	+ 80 %	15,367	Residential
Alandur	15,610	22,112	+ 41.5%	27,640	Residential //
Pallavaram	11,941	12,253	+ 36 %	11,527	Industrial
St. Thomas Mount-cum Pallavaram (Cantt.)	15,125	15,790	+ 4 %	7,113	Residential
Villivakkam	11,364	15,203	+ 34 %	n a.	Industrial
Madras City	1,416,056	1,729,141	+ 22.1%	35,339	Port.

n.a. — Not available.

§§ — See text for details regarding type of towns.

// — Classified as "Residential" in the Census, but according to the census itself is said to have the following industries : *automobile valves, electric lamps, rice, oil and flour mills, metal galvanising and tinning.*

Source : Census of India, 1961 Vol IX, Part I—A (i).

The first thing that strikes the eye in Table 9 is the fact that most of the "Suburbs" of Madras City have registered a much higher rate of growth than the city itself during the decade of 1951-61, with the variation in Tambaram being as high as 80%. Tiruvottiyur is a close second with a 68% increase in population over the decade. At the same time there has hardly been any change in the total population in the St. Thomas Mount-Pallavaram (Cantt) township and the population of Poonamallee has *fallen* from 20,677 in 1951 to 11,900 in 1961—a 42.4% *negative* variation. Is there any pattern here and can it be explained? Three possible explanations can be given to the growth of towns of this kind. The first would be to say, as has been discussed in

Section I, that the growth of towns is positively correlated with their size. Table 9 does not lend much support to this explanation. Secondly, it could be argued that there is a negative correlation between density of population of towns and their rates of growth.[9] This again, does not seem to get much support from the Table. Thirdly, then, it could be argued that the growth of towns depends upon its functional characteristics. In the last column of Table 9 the towns have been classified according to their functional characteristics, Industrial, Residential etc., This classification is taken from the Census. Unfortunately, the basis of this classification is none too clear, The Editor of the Census simply says: "The category, 'Industrial and Manufacturing' includes old places of importance where household industry has been located. They also include those places where new industries have been established in recent decades. "Residential and ducational" is a classification which applies to a series of towns not otherwise classifiable"[10] It is difficult to press such classification into use in any rigorous manner. But for the purpose of this paper one needs to draw a distinction only between chiefly residual towns and the miscellaneous residential category which, for convenience may be identified as "industrial". The best way to distinguish between these two types is to compare St. Thomas Mount-Pallavaram (Cantt) town with Tiruvottiyur. On the basis of the observable differences between these two suburban areas one may explain the pattern observed in Table 9 in terms of the functional characteristics of the towns. Poonamallee which registered a negative variation in population in the 1951 to 1961 period and the St. Thomas Mount-Pallavaram (Cantt) area where there was only a very negligible increase in population are both "Residential" towns. On the other hand, Tiruvottiyur, Alandur, Pallavaram and Villivakkam where the rates of growth of population were higher than that of Madras city are all "Industrial" towns. The only problem is presented by Tambaram which registered the highest positive variation, but is classified as "Residen-

9. See, for instance, Pravin Visarin, " Growth of Greater Bombay, 1951-61" *Economic and Political Weekly*, Special Number July 1969.

10. Census of India 1961, Vol IX, Part I — A (i) p. 241. other types of town are 'Administrative', 'Trade and Commercial' and 'Transport and Communication'.

tial". But, it will be recalled that according to the Census classification, "Residential and Educational" towns are a residual category and the Editor of the Census Report stated that where educational institutions are prominent such towns have been included under the "Residential and Educational" category. If so, Tambaram comes under this category because of the Madras Christian College. While the college may give Tambaram a classificatory identity it has been shown by studies conducted by the Economic Department of the college that the rapid growth of the town in recent years is mainly due to the expansion of the IAF base, and to some extent the Vandalur car factory. Tambaram, therefore, is largely a "service" town. In any case it can be shown without much difficulty that the functional characteristics of Tambaram is derived from what is happening in Tambaram. In this sense it is very different from a "Residential" town like St. Thomas Mount. If this is so, then what Table 9 tells us is that the functional characteristics of most of the "suburbs" of Madras are not derived from the city of Madras at all, but from the nature of economic activity within the suburbs themselves. It may be noted too that of the towns that were brought into the Madras Metropolitan conurbation in 1961 the vast majority—Villivakkam, Ambathur, Anakaputhur, Nekkundram, Erukkancheri, and Tirusoolam—come under the "Industrial" category. The "Residential" towns are small ones like Meenambakkam and Selaiyur, towns of Class VI size.

On the basis of all these observations, I would like to put forward two closely related hypotheses: First, as against the widely accepted definitions of urban agglomerations, the suburbs of Madras city, and possibly of other main cities in our State are not related to the primary city in terms of a territorial and functional differentiation. Secondly, it is "industrialisation" defined in a broad sense that accounts for the existence and growth of the suburban towns. While both these may appear to be nothing particularly extraordinary from a common sense point of view their implications are quite significant from academic and policy points of view. I shall examine some of these implications in the final section of this paper. But before I do that, I may point out what sort of information would be required to elucidate further and test the hypotheses.

On the whole we have a great deal of statistical information about our urban areas : no one can fail to be struck by the variety and thoroughness of the statistics given in the Census Reports themselves. But usually these pertain either to urban areas in general (as for instance the density of urban population according to districts, the distribution of types of towns in the districts etc.) or to the major cities such as Madras. In fact I have a feeling that the wealth of material contained in the 1961 Census Report regarding Madras City has not been adequately utilized either by Government and civic agencies or academic bodies. But when it comes to smaller towns, especially towns of size class III and below our information is very scanty, as I have already shown in this paper. To test the hypotheses I have put forward we would require much more information about these classes of towns because most "suburban" towns belong to these categories. Specifically it will be necessary to have information about the occupational characteristics of the labour force in these towns. I am doubtful whether we can go according to the usual classifications of "agriculture", "industry", "trade" "services" etc. These presuppose a certain differentiation of economic functions which the labour force in our urban areas may not yet have. But such categories could be used as a beginning. It will be equally important to have information about the places where the towns people work. I tried to find out from the civic authorities in Tambaram and Tiruvottiyur the proportion of the residents of these towns who are working in Madras City, but such information was not easily available. Thirdly information about the in and out-migration to and from these towns is very important. Obviously the phenomenal growth of towns like Tambaram is the result of in-migration. But where do the migrants come from—from the city of Madras as we would be led to believe if we take the "suburban" link seriously, from other towns or from the outlying rural areas? From my knowledge of Tambaram [11] it would appear that most of the migrants come from fairly remote rural areas. The links of suburban towns, and consequently their characteristics can be studied only if we have detailed knowledge about these aspects. Apart from statistics, motivational studies

11. See Planning Forum, Madras Christian College: *Business Units in a Suburban Area : Report of a Survey in Tambaram, 1967.*

will also be required to come to any definite conclusions about the nature of "suburban" areas.

III. Some Implications :

The common element of the two hypotheses that have been developed in Section II is that the links between a major city and its surrounding towns in Tamil Nadu (all over India) are not of the kind presupposed and developed in the western literature on urbanisation and urban agglomeration which most of us tend to accept uncritically. It is but natural that Western writers would bring into their studies of urbanisation the concept of "differentiation" which is a fairly well established feature of their economies. The concept of territorial differentiation which underlies the Western treatment of Metropolitan Area is but an extension of the idea of functional differentiation into space. The links between the metropolitan city and its agglomerates in western literature are the kind of interrelationships and interdependencies which arise from the explicitly stated functional and territorial differentiation. How pronounced is such differentiation in our context? This is a serious question which has both theoretical and policy implications: I have raised them in some of my earlier writings.[12] If such differentiation is not, or not yet a feature of our economy, is it appropriate to expect to find in our urban agglomerates the same kinds of links and interdependencies that are seen in Western countries? In the context of urban studies this is the crucial question which most of our scholars on urbanisation—mostly sociologists and geographers—have failed to recognise. Consequently in our discussion of urbanisation we raise the wrong questions. Even correct answers to wrong questions are not particularly helpful!!

Let me illustrate. One of the few questions of an economic nature raised in the discussion of urbanisation is the relationship between urbanisation and industrialisation. One of the earliest and most rigorous treatments of this problem in the context of

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12. *A Theoretical Approach to the Indian Economy*, (Asia Publishing House, 1970) and *Indian Economic Crisis -- A Diagnostic Study* (Asia Publishing House, 1969).

"underdeveloped" countries such as ours is B. F. Hoselitz's essay "Urbanisation and Economic Growth in Asia." Hoselitz postulates a "normal" (i.e. historically valid) relationship between the process of urbanisation and that of industrialisation and arrives at the conclusion that urbanisation in Asia has run ahead of industrialisation, and that consequently countries of South Asia particularly (including India) should be regarded on the whole as "over-urbanised." The argument is worth quoting in full. "We arrive at such a judgment inspite of the fact that in Asia only one in twelve persons is a city dweller—as against one in eight in the world as a whole, approximately one in three in North America, and one in five in Europe—by the following reasoning . . . For Asia, as a whole, approximately 13 per cent of the total population is "urban" and more than 8 per cent metropolitan urban".[13] Now urban populations are characteristically non-agricultural. Of course, industries are not entirely concentrated in cities, and, in fact, there exist a sizable number of rural cottage industries, as well as a few large scale plants in the country. Hence, although the proportion of the urban population is only 13 per cent, the proportion of the non-agricultural labour force is roughly 30 per cent. However, at a similar degree of urbanisation in the Western countries, the United States (1850's) France (1860's) Germany (1880's) and Canada (1890's) had roughly 55 percent of their labour force engaged in non-agricultural occupations."[14] It is on this basis that Hoselitz characterises Asian countries as "over-urbansied". Among the conclusions he draws from this is that urbanisation leads industrialisation. He recognises too that migration to the city is due less to the "pull" i.e., the attractiveness, which the city exerts, and more to the "push" experienced in the country. He goes on to add "In Asia many people have drifted into the city because political insecurity made living in the country impossible or highly dangerous, or because bandits and insurgents destroyed their homes, their land, or their crops".[15] In a volume dealing with the sociological aspects of economic growth this explanation of the process of urbanisation in Asian

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13. See his *Sociological Aspects of Economic Growth*, Free Press of Glawcet, 1960. The essay itself was first written in 1957. See also other essays dealing with cities in the same volume.
14. Ibid. pp. 226 & 228.
15. Ibid. p. 228.

countries may be appropriate, but it is a little too naive an explanation all the same! But notice here the basic assumption of differentiation. People have to decide where they should live (after having decided what they should do) and because there are bandits in rural areas they go to the city. They are not attracted by living conditions in the city, but are driven away by the living conditions in the village! It is this kind of argument that usually dominates the discussion about suburbanisation also. Those who work in cities have to decide-where they would live and because they don't like the crowded down-town area they decide to live in the "suburbs". The suburbs are consequently residential areas of the well-to-do.

But if it can be shown that in our context for the vast majority of people the "where to live" question cannot be separated from the "where to work" question, then a suburb is no longer the residential area of a metropolitan city, but like the city itself an urban aggregate where people work *and* live. And again, if for the vast majority of people "where to find work" is the more crucial question, that will be the issue which mainly determines the size and growth of urban aggregates whether or not it is compatible with the historical patterns of the United States, Germany, France or even Japan.

One can press this argument into service a little more. In our situation, on the whole, it is not easy to separate the "where to work" question from the "where to live" question because the "where to work" (and in fact "what to do") questions cannot easily be separated from the "whom to employ" question, or "for whom to work" question. If what we have learned from Tambaram is any indication at all, such lack of differentiations of economic function is one of the main clues to the understanding of our "suburbs".

Problems of this kind cannot be dismissed simply as matters of intellectual curiosity alone. They are of great policy significance both in the realm of urban planning and the general pattern of economic development of the country.

If metropolitan areas are assumed to be based on the principle of territorial and functional differentiation, it is possible to claim that there is a universally valid pattern of metropolitan organisation and influence which transcends international borders. Such claims in fact have been made. A writer recently comparing Kanpur and Hyderabad from the point of view of their metropolitan characteristics says: "The Western experience of urbanisation suggests that the evolution of a metropolitan economy tends to generate certain common patterns of city-region relationships, such as the gradient pattern of metropolitan influence over the surrounding region, and also to bestow upon central cities several common ecological characteristics, such as spatial distributions of functions by concentric zones or radialing sectors. Many claim a universality for the metropolitan characteristics observed in the West that is presumed to transcend international borders. It is within the theoretical framework developed from Western experience that we propose to consider the process of metropolitan growth in India..."[16] If there is a universal pattern of metropolitan structure and influence there can also be a universal pattern of metropolitan planning. It may show some regional or other variations, but these peripheral differences can be easily identified in terms of standard types—the London type, the Washington type, the Paris type etc. In this sense many aspects of urban and metropolitan planning *anywhere* are determined *a priori*, and urban planning becomes an almost exclusively "civic" problem—how many parks to have and where to locate them, what types of road to have and where, should there be more reading rooms and hospitals etc. And the rings of the concentric circles more or less settle these issues.

If, on the other hand, the metropolitan area cannot be considered to be territorially and functionally differentiated, there is little that can be said *a priori* about its nature and organisation. Each metropolitan area then becomes a unique entity with its specific features and its specific net work of relationships. Metropolitan planning then becomes a very demanding task—more than

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16. S. Manzoor Alam: " Metropolitan Growth Trends and Regional Relationships—Kanpur and Hyderabad " in P. B. Desai at al ed., *Regional Perspective of Industrial and Urban Growth — The case of Kanpur* (Macmillan, 1969). Many of the other essays in the volume are also based on such an assumption.

a mere civic problem, but a techno-economic and socio-economic issue. In particular the relationship between the central city and its "suburbs" becomes a matter for very detailed examinations. No longer can the towns around be treated as functional segments of a well defined metropolitan area with the central city determining their nature and roles on the radial principle. If our conurbations are not functionally differentiated agglomerations, but a hierarchy of towns the nature of the relationship between the central city and the suburban towns and among the suburban towns themselves need to be studied carefully as a pre-condition for any metropolitan planning.

And the city-town relationship cannot be fully understood apart from the town-town relationship, the town-rural relationship and the city-rural relationship. It is the set of these relationships which gives the towns and cities their identities and specific characteristics. And notwithstanding certain territorial uniformities, there is no reason to believe that the set of relationships is the same for every city and town for all times. One may make here an impressionistic comparison between Tambaram and Tiruvottiyur, the two suburbs of Madras which registered the highest rates of growth during the 1951-61 decade. These two towns have continued to grow at a remarkable rate during the decade of 1961-71 as well. The population of Tambaram increased from over 33,000 in 1961 to 54,640 according to the 1971 Census, showing a growth of 64 per cent. Tiruvottiyur's population grew from a little over 37,000 in 1961 to 82,900 in 1971, an increase of 146 per cent. For those who want to treat it as a residential suburb of Madras, there is enough evidence: it has five different housing colonies, the State Bank colony, Wimco Nagar, Parry colony, Ennore Thermal Station colony, and the Housing Board colony. And yet Tiruvottiyur is emerging to be a "city" in its own right (soon it will graduate into a Class I town) complete with eight separately identifiable slums! Do Tambaram and Tiruvottiyur have the same kind or relationship with Madras? Do they have the same kind of relationship with their surrounding rural areas?

This leads me to the last set of issues I wish to raise. Do my observations about the nature of cities, and of "suburbs" in parti-

cular have any bearing on the pattern of economic development in general? This is not a new question. Among others John P. Lewis has raised the question in a very poignant manner in his *Quiet Crisis in India*,[17] and the general debate on the subject is therefore familiar. I would only attempt to link up this issue with the central thesis of this paper. It is one of the clearest evidences of our unconscious commitment to the general principle of "differentiation" that when it comes to industrial location we talk economics (or is it politics?) and when we deal with urban problems we *talk* civics! There was a *time* when locational considerations did not explicitly enter into our discussions of allocation of investment. But with emphasis on regional planning locational considerations are being given explicit recognition—but they are still confined to major projects and key industries. But, if at the grass root level our economic structure is basically undifferentiated, most decisions about economic activities should involve a techno-economic-civic locational problem which, in a sense, should become the heart of our planning problem. The way to depict this is to say that our problems are not to choose between agriculture and industry, or between rural areas and urban areas but to locate ourselves in the "agro-industrial-rural-urban continuum" to use Lewis's expressive, if a little clumsy phrase. My argument has been that the suburbs come not only between the rural areas and the metropolitan city in a geographic sense taking away the sharp distinction between town and country (two concepts resulting from one differentiation) but equally between agriculture and industry (two concepts resulting from another differentiation). In this sense the "suburb" is a distinct entity, and perhaps we have not even begun to understand its specific characteristics and problems.

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In discussing the paper under the Chairmanship of Mr. T.S.R. Narasimhan, Assistant Commissioner of Income Tax, Madras, there was general agreement that the studies of the urban—suburban complexes in Tamil Nadu must be undertaken at the micro level. Even at this level of individual units of towns and

17. John P. Lewis, Quiet Crisis in India (Asia, 1962) Ch. 7.

cities, the study should identify the various sub systems existing between the different households. Should policy making and planning await such detailed studies and data collection? It is possible to base planning on a complete assembling of all factors and this is usually the technique in planning for small units. In the case of larger units, the type of data collected and available should be sufficient for forecasting trends. In the case of very large units the forecasting and planning can be based on the time sequence of major movements within that complex. The future of cities in India and in the States was discussed and the view was expressed that the trend is for the disappearance of cities and their replacement by a cluster of towns. This future development might be slowed down by the sanctity attached in this country to the seats of Governmental power which are the major cities. The role of modern architecture in the future development of cities must be taken into account in urban planning.

The relative importance of industrial and commercial development, the growth of infrastructure, the migration of small entrepreneurs, and the economies and diseconomies of urban versus suburban living were emphasized. There was general agreement that the data basis for the planning of urban-suburban development in Tamil Nadu is extremely limited and almost non-existent. The models and theories in this area that have been and are being developed in the industrialised countries are of limited applicability to the situation in Tamil Nadu and India. There is therefore need for detailed care and data gathering studies based on the multiple relationships between city and town, between city, town and country, within city, town and country, covering economic (work and occupations), infrastructural (power and transport), social (higher education locations) and cultural facets (caste and community) in these areas.

IMPROVING POLYTECHNIC EDUCATION IN THE SOUTH *

Our Achievements and Beyond.

I must begin with offering you my congratulations on this forward looking programme of six short term courses for the principals of polytechnics in the Southern region on "Modern Educational Practices". These quality improvement exercises have been the subject of repeated recommendations by Unesco and the World Federation of Engineering Organisations. In just 1970 Unesco and the Federation have come out with three reports on Technician and Engineering Education. In addition, Unesco has just issued a most enlightening evaluation on the use of television for polytechnic instruction in Poland. I would like to say a word on this innovative project, as it represents one of the few exceptions to our using technology in all but the education field. In it, television lectures were given for the first two years of the polytechnic in both general and technical subjects. The Polish project reports that the television lectures raised the standards of the courses, curricula and text books leading to the modernisation of curricula, the selection of the best text books and the elimination of a number of short-comings in polytechnic training. We in India are not yet able to use the television tool but when we do, the aim of this programme here will be even more surely and speedily realised. Preparation for the use of this medium including the training of teachers in its use requires a five years lead time. According to present plans, we in the South are certain to have this facility by 1975. It will therefore be prudent for some of you, particularly the distinguished staff of this and other technology teaching institutes, to begin planning programmes through the television tool for the quality training of our technicians.

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* Extracts from the Valedictory Address by Dr. Malcolm S. Adiseshiah to the Sixth Study Conference held at Madras of Principals of Polytechnics, Southern Region, on April 27, 1971.

This programme which we are concluding today is part of our response to the crisis in education that we face in India and in every country, both developed and developing, in the world. The crisis in education is part of a larger crisis : the political crisis which is expressed in the violence during our own elections, in the tragic loss of life in East Bengal and in the Middle East and Viet Nam wars : the economic crisis embodied in the growing gap between the rich minority and the poor majority internationally as between nations and nationally for us here in India : and the social crisis expressed in the ceaseless struggle between status quo and change.

Educational Crisis :

In the educational arena we took a look at the crisis as we face it here in India and in all countries of the world on the occasion of Unesco's International Education Year in 1970. We saw then that the education crisis is one of numbers. Whether it be the number of pupils enrolling in our schools, or the number of teachers who have to be trained or the number of high schools, polytechnics and universities which have to be built or the number of illiterates who have to be made literate, the quantitative dimensions are overwhelming to a point where the quantitative problems become qualitative challenges. We also saw that the educational crisis is a crisis of relevance. How relevant is the education that we offer to the child, the adolescent and adult to the moral, economic, social and personality fulfilment needs and demands that he or she faces ? Here however, I must warn you that we cannot expect education to do the impossible, to be relevant to an irrelevant society. If it is true that while we teach children to be honest, we in society practise dishonesty in our business and professional lives, then it is society which calls in questions the values of man which are the values of education. If we teach a technician to be inventive and innovative and then turn him loose on a stagnant and sluggish rural society, it is society and not education which is responsible for his unemployment and mis-employment. Within these limits, education too has made its contribution to its social irrelevance. With its built-in teaching inertia and learning conservatism, education has not been very relevant in fostering a growing and changing society. Finally the

education crisis is also a crisis of resources. The fifties and sixties saw a tremendous expansion in educational expenditures and scientific investment. The average annual rate of their increase was 15 per cent. In fact some economists were warning us that if we went on expanding education at that rate, we will soon be using up our entire GNP on education, and we would have no additional food to eat, no further clothes to wear and no roads or houses to be expanded. The world would be peopled by intellectual zombies with nothing else to do and nowhere to go. This is like the kind of bogeyman stories that were used on us as children to keep us quiet. The truth however in these warnings is that we start the seventies with a cut in educational expenditures and scientific investments in all countries including our own, at the very moment when national and social demands call for additional resources, which will never be adequate if we simply continue with the linear expansion of our present costly and inefficient education system.

Towards an Improving System of Polytechnic Education :

It is natural therefore that polytechnic education faces critical points of quantity and quality, of programme content and training structure of teaching methods and learning techniques, of employment orientation and special finality which you have been reviewing extensively during your courses. Within this frame, I would like this evening to call attention to some seven features and one general conclusion concerning polytechnic education as conforming both to your own discussions in this programme and to the international consensus which the review of technician training has helped to produce.

A Bridge : First polytechnic education is a bridge between education and society. The training of technicians is on the one hand an integral part of the educational system. This feature is reflected in the prior preparation of its students in the educational system, in the selection procedures for those entering the polytechnic and such guidance and counselling as may be available to them. It also relates to the link between polytechnics and universities, and in our country with the Indian Institutes of Technology, which help them keep alive and promote research and develop-

ment in applied sciences. On the other hand the main purpose of the polytechnic is to train producers at all levels and in all forms. This involves the deep rooted nexus of polytechnic institutions in all forms of social production. Being a bridge is not easy. There is always the temptation to fall off on either side of it. The training of technicians is neither an independent ad hoc activity nor is it to be assimilated to other levels of education. From every point of view polytechnic education must maintain its unique and difficult feature of being a link.

A definition : Second polytechnic education is concerned with the education of that highly elusive person - the technician. We all know what an engineer is. We also know what a skilled worker means. But a technician? Even the Unesco/ILO definition in the 1962 Recommendation reflects this ambiguity. It offers a negative definition. "The term technician" states the Recommendation "applies to persons working in occupations requiring a knowledge of technology and related sciences between that of a skilled worker and that of an engineer." This is no definition. It does better on a description. "Occupations at the technician's level may call for inspection and maintenance detailed development plans, supervision of production work and detail construction. Collaboration with the engineer is an essential part of the work of the technician." In this extremely general and flexible characterisation, the technician's supervisory as well as organising functions at all levels of production seem to stand out. In addition with the increasing diversification of industrial activities as well as those of the primary and tertiary sectors and their rapidly changing patterns of technology, a degree of indepths skill is required of the technician, making polytechnic education a continuously and constantly diversified one.

A Function : Third and as a consequence polytechnic education is distinguished by the functions that the technician is required to perform, not by the level of training that he is expected and required to undergo. The functions carried out by the technician cover indeed a wide spectrum. They could be described vertically as covering the distance between the engineer and skilled worker. They could be described horizontally as ranging

over the engineering, scientific, agricultural and commercial fields. Thus the training of technicians is not a certain level of training but a certain kind of training, not in a certain institution but in a certain spectrum. Technician training involves multiple combinations of academic, scientific, technical and industrial inputs.

A curriculum : Fourth polytechnic education has a special curricular content ranging over basic sciences, technology subjects, foreign language, data processing, measurements, control techniques, social studies, engineering economics and industrial experience. The technician curriculum has to have a balance of basic science and technology subjects as well as the appropriate concepts and knowledge of the degree of technical sophistication possible and feasible in operations, materials and type functions prevailing in the local industries. From this point of view, each polytechnic curriculum has to be very specific, very particular and very local but in methodology, subject matter and course distribution should be grouped into modules, should be learner based, should be inter-disciplinary and problem oriented, using the nature and methods of the systems approach to a problem. The polytechnic curriculum is therefore both particular and specialised in relation to each locality and conforms to the criteria of flexibility in the system of education, diversity in specialisation, and adaptability and originality in work given. Such a curriculum will ensure practical training, continuing education in the form of further study, up-dating of knowledge and capacity for team work which is an increasing characteristic of modern industrial activity.

The Industrial Base : Fifth polytechnic education has a deep and multifaced relationship with industries. In the south and in nearly all countries, I have noticed, that this potentially enriching relationship seems to degenerate into a system of mutual recrimination. The polytechnics blame industrialists for their invincible ignorance in scientific matters, leading to non use or mis-use of technicians. The industrialists blame the polytechnic for their theoretical approach and launch their own half baked education programmes. There is blame on both sides. Staff and students in polytechnics living in an academic mileu are inclined

towards projects whith have an abstract scientific flavour and theorising glamour, leaving aside the practical every day problem that the small or medium local industrialist faces with regard to heat resistance, cost push and other factors. The local industrialist who has to struggle with the daily round of productivity, licensing, export promotion, import substitution, mergers and integrations and other inducements and controls tends to forget that if the polytechnic is approached with precise questions, it can turn out the specific answers or quality product that he is looking for. This means that the industry/polytechnic relationship is multifaced. On the one hand the training programme of the education institutions must include as part of the eight hour curriculum, work in the neighbouring industries, be they large, medium or as so often is the case for any of our polytechnics, small. Particularly in the South a greater part of the work experience has to be in the small industries in the adjacent communities. Such integration of practical industrial experience is not only a part of the balanced curriculum, it is also an essential for the over-riding need of continuing education. It is the door leading to specialised training in the industrial activity that the student will later enter. This also means that such practical work experience should be organised by the industrialists and not programmed by the polytechnics. On the other hand it is equally imperative that the industrialists, large, medium and small, should have continuous access to the technological development and innovations that are programmed and stimulated by the polytechnics. Industrialists need this technical assistance if they are to survive in the fast moving competitive world of business. In any case polytechnic education does not end with the receipt of a diploma. That is only the beginning of the process of continuous learning and updating during the entire working life of the industrialist. Thus the polytechnics must have a built in sandwich system to round off the training of their students. Equally industry needs a reverse sandwich system under which their engineers and technicians can have access to part time courses in the polytechnic. In other words there has to be a continuous multi-dimensional flow between each polytechnic and the industrial activities in its neighbouring locality in the interest both of the institution and industrial growth.

Planning : Sixth polytechnic education like all technical education must be a function of dis-aggregated and detailed manpower and local skill planning. The crisis in polytechnic education is wide ranging. We have moved from a period of terrible shortage of technicians in the fifties to a period of apparent plethora and unemployment of engineers and technicians in the late sixties, and now to a continuing demand for educational diversification to meet now skill bottle-necks. For the moment we seem to be shifting from quantitative sufficiency to qualitative deterioration. In this whole area, the planner, the administrator, the polytechnic principal and the employer seem to be lost and to be moving around in circles. A sound technical education system must be based on manpower and skill planning by every occupation and activity. The lead time required by polytechnic education is five years and by the educational system as a whole ten years. It is possible to project the precise skill needs by industrial activity over this period and for polytechnic education to use the results as a feed back to its programme, subject to the usual rolling adjustments. But our technical education system faces also a pressing need today — the scandal of our unemployed engineers and technicians. Here our polytechnics can use their knowledge of the unmet diversified skill needs of our various industries and agro undertakings and use reconversion techniques to retrain our polytechnicians in those needed indepth skills, as well as in entrepreneurial skills. More and more polytechnic education must equip the technician in the making of independent decisions and deciding practical jobs for himself. If such reconversion programme is supported and supplemented by well planned and wide ranging financial help to the technicians, that will constitute one effective response to technician unemployment and provide the kind of spurt in industrial recovery which the country's total production effort so badly needs.

Teachers : Seventh Polytechnic education calls for a very special programme of teacher training. In all countries the greatest shortage in the teaching profession is in teaching in technical institutions. And the reason is not hard to find. It was not till a decade ago that it was assumed that to be a good maths teacher you had simply to be a good mathematician, to be a good history teacher you had to be a good historian, and to be a good

polytechnic teacher, you had to be a good engineer or technician. I admit that sometimes today we seem to have swung in the opposite direction. In one technical training college in Africa, I found four poor professors in the basic sciences of physics, chemistry, biology and mathematics surrounded by 12 teaching methodology specialists. The teacher in the polytechnic occupies a strategic position. On him rests the training and creation of the learning experience of that elusive person called the technician, the design and utilisation of the pedagogic methods and content which I have referred to, the use of experiments of the active and participative methods and of available educational technologies, and the practice of that most difficult of arts, which is responding fully to local conditions while at the same time, reflecting the latest technical and scientific developments. Your fourth study conference affirms that " teaching should be a scientific profession and that they began to look upon themselves chiefly as teachers, shifting the emphasis from administration to education." The technical teacher is the linchpin in the technical education system.

In all these rather high sounding descriptions of his calling, the teacher in the polytechnic may not be able to recognise himself. More often he feels himself to be in the position of a worker being asked to make bricks without straw, and at unviable wages at that. The technical teaching profession is vital. Its status is on the other hand unattractive. The remedy to this paradox is simple and is within our reach. It has been established by Unesco, which recommends " that the technician teacher should be offered the same status as that of other teachers or professors teaching under other disciplines to the same age group in other institution. In recognising the status of the technician teacher, his industrial and practical experience should be fully compensated."

In connection with the vocation of teachers there is one particular point that I wish to make. I have as you know just returned from participating in the International Seminar on Education in the year 2000 at Madrid, Spain. The main message of the Seminar was that technology which has swept all of society has so far been kept out of education and is one cause for education's irrelevance, inefficiency, and unproductivity. We must now use in education all the technologies, available to us—from

systems analysis, television instruction, micro-teaching, the computer and the information circuits. In all this the teacher has to be trained. I would like to appeal to the polytechnics and because of their special relation to technology, to pioneer this ushering in of the technological era in Indian education.

Concluding comment—Decentralisation :

What do these seven feature of polytechnic education point to ? I started with the concept of technician education as a bridge between the education and social systems, continued with it as the education of an indefinable but vital link in the production chain, as a spectrum of functions rather than a point in the academic hierarchy, as a balanced range of general & specialised,unified & diversified learning skills, as a product and a part of the industrial mileu of the locality, as a function of the planned and disaggregative skill demand and as needing a kind of teacher and principal who combines many opposing and impossible qualities of head and heart. Can this be achieved ? Yes, on one condition—that our technical education system in this vast sub-continent. particularly in the South, is administratively decentralised and managerially deconcentrated to the point where every polytechnic can be tied in with the local industrial activity, respond to its needs and draw its light and life from its support. I believe it is time that we treated the principals of our polytechnics as responsible and responsive educational leaders, our polytechnic professors as qualified and competent guides, our polytechnic students as committed to serving themselves and their industrial community, and the industry around each polytechnic as a mutually reinforcing, helpful and creative part of the polytechnic base. This programme of qualitative reorientation and quantitative restructuration, of ushering in use of the needed and adopted educational technology and relating all learning to local needs, if it is to succeed, must be accompanied by a degree of programme and administrative decentralisation and managerial independence with relation to each polytechnic. It is in that way that our polytechnics may help our whole education system to become technologically as viable as our industry and agriculture have become. That way lies progress, both education and economic, which all of us desire, demand and deserve.

CORRESPONDENCE

Extracts from a letter entitled; *Some observations, reflections, comments and questions*: from Miss K. Jhaveri, Aurobindo Ashram, Pondicherry, on "Education of Women and Girls in Tamil Nadu", which was the subject for discussion at the July Seminar.

Much of what I wish to invite your attention to, is for my own enlightenment. It has already been voiced in one form or another, though from a slightly different angle. I feel the truth in each view point expressed at Seminar, but my own experience as a student leads me to believe that most of these problems arise because one is not *quite clear about one's aim in life*, and therefore the aim of education, and because one does not take into account, the complexities of human nature.

1. My persistent comment and question is: Should education, whether it is for man or for woman, be *considered only from the point of view of economics or financial benefits*? Some how, all the papers read at the Seminar seem to be geared to this objective. Does not the overdue stress on this aspect vitiate the perspective of the problem on hand? Is not such an approach, detrimental to a true understanding of it and thus hinder its true and speedy *solution*? *The chief aim of the* Institute may be economic development, and it may be a mistake on my part to expect from it, something that it is not supposed to give. But I have asked you this question because you have always defined "Development" in rather broad terms and declared that "the awakening of man" is the *supreme goal of all development*, its alpha and omega. And I feel that to gear everything towards economic development may take us round and round but lead us nowhere if this supreme vision is lost sight of.

2. As regards women's education, I believe it is as much an individual concern, as it is *collective*. "*A blade of grass* can be a sword in the hands of the strong," and I have a feeling that

if social prejudice is responsible for women's education lagging behind, the right remedy will be to strike at such social prejudice, rather than encourage it by establishing separate schools for girls and boys. Personally, I cannot see much point in educating boys and girls together up to a certain age and then segregating them later. This can only highlight their sex consciousness and create an unhealthy attitude. The pains and pleasures of sex exist side by side, and it all depends on how one takes both, which is a matter of education. No problem can ever be solved by escape, or encouraging others to escape. It is only when we are confronted with a problem that we seek a solution to it, and make some progress. Perhaps, educational films, and particularly relevant cultural items of interest can remove these social prejudices.

3. We are told that in spite of many facilities given to advance women's education, the response is poor. Why? First, I feel, along with Mr. Krishnamurty, the problem is woman herself, and unless she decides to change herself, nothing and nobody can make her. Second, I feel that education is not made to suit the needs of women, and there are types and types of women. There is no person who is whole female, or whole male. Or, is there? Therefore the distinction between man's education and woman's education is rather arbitrary; and who can decide what type of education should be given to woman? In her relation to man, she can be a slave, a domestic, a house wife, an entertainer, a helper, a companion or a friend, a complementary soul and a collaborator, a mother—or all these at once—whatever she chooses to be. It depends on her special temperament, tendencies, abilities or potential, and choice. A woman can perform better, any of the tasks supposed to be under man's exclusive domain. If she has not achieved it yet, is it not because she has never made an attempt to? If, instead of every time harping upon the differences between man and woman, we gave equal facilities to them in all stages of life, we can surely cure the society of its dogmatic beliefs, and both man and woman will be equal partners of a common enlightenment and growth, sharing a complete life by being a mutual source of inspiration and strength — each person in his or her own way.

4. It seems to me that the ultimate aim of education is to educe—or draw out, rather than instruct—what is already there in the individual, and help it to grow in its own natural way. Each person I believe, is born with certain potentials and possibilities which are exclusively his own, and unique according to the role he is destined to play in life, and he seeks and meets the forces which help him to fultil that role; All that education can and must do, I feel, is to help him to find it, develop it to its fullest possibility, and offer him the opportunity to freely manifest it. It is only when education contrary to this role is forced upon him that it goes to waste, because it is not relevant to the needs of his growth, nor to the field of his unique manifestation. In Nature's economy there is a perfect balance between the demand of society and the supply by individual, and this balance should not be disturbed by artificial compulsion, nor discouraged by inadequate facilities. Does this not explain the dictum of all seers throughout the ages: ' Know thyself ", as the preliminary requisite of all happiness? Will it not also help solve the problem of unemployment and social tension ?

5 Finally I feel that no education is complete which does not help the individual to make life whole-some, harmonious and beautiful in all its aspects, external and internal; and it seems all parts of one's being — body, heart, mind, soul and spirit — should be given equal importance in education. When balance in the training of these parts is upset and consequently the harmonisation among them is not achieved, frustration sets in, and further problems, individual and social, are created. This condition is the same, both in men and women, whatever may be the subjects in which they are individually interested.

6. As regards education through radio and correspondence courses is concerned, I feel it may help towards or lead away from, its true objective. The main defect in this method seems to be that it does not provide an opportunity for individuals to come together in active participation and confrontation, which are the basic requirements for a healthy development of mind or inspire original thinking. Education is needed to regulate human relationship, but this mechanical form can only stuff the mind with

information, or inculcate dogmas by indoctrination when the mind is not developed enough to digest them. It may even create misunderstanding and confusion if not rightly received. Besides, education that is not made relevant to the life of an individual by active participation often goes to waste even though it may be an added means for growth and expansion, since something is better than nothing, depending on what is offered, and how, and to whom. Still, I feel that what is needed is not palliatives but cures, for compromises only detract us and delay the solution, even impede the march of progress, collective or individual...or, do they serve some useful purpose ?

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